

ARMkey Firmware Engineering

Silicon Valley Forth Interest Group

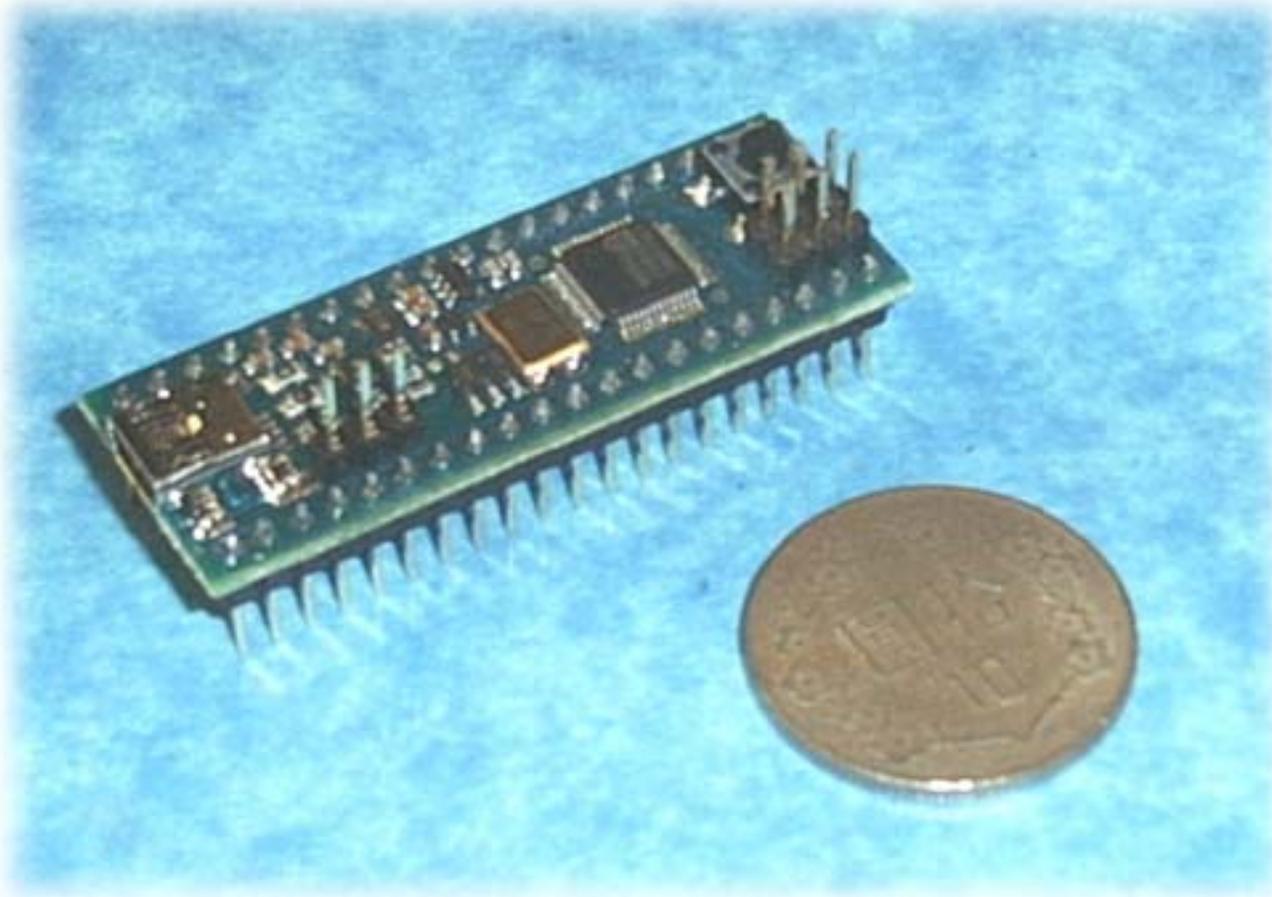
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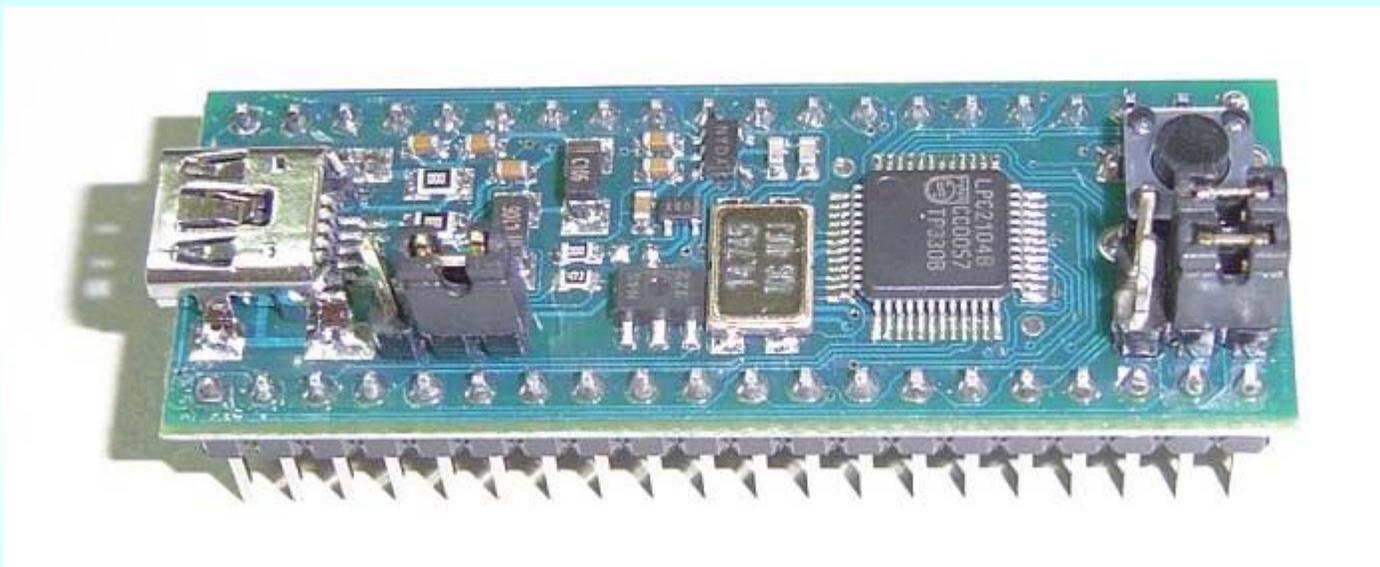
Summary

- **ARMkey in 40 Pin DIP packages**
- **ARMKey Features**
- **LPC2104 Peripherals**
- **USB Interface**
- **GPIO Interface**
- **Reset Configurations**
- **eForth System**
- **Metacompiler**
- **Demo**

ARMkey in 40 Pin DIP



ARMkey in 40 Pin DIP



ARMkey Features

- **Philips' LPC2104 ARM7 Chip**
- **128K bytes Flash RAM**
- **16K bytes SRAM**
- **Up to 60 MHz clock**
- **USB interface with PL2303X chip**
- **8051 compatible 40 pin DIP package**
- **32 multifunction IO pins**
- **In System Programming ISP**
- **eForth Firmware engineering system**

LPC2104 Peripherals

- **32 bit GPIO**
- **2 Counter-Timers**
- **Watchdog Timer**
- **PWM**
- **RTC Timer**
- **I2C Serial Interface**
- **SPI Serial Interface**
- **ISP, IAP and JTAG Configuration**
- **2 UART Ports**

USB Interface

- **USB cable connected to PC, providing self sufficient firmware engineering platform**
- **Using PL2303X USB chip from Prolific**
- **Power from USB or external source**
- **USB-UART driver for Windows**

GPIO Interface

- **32 Gernal Purpose IO pins**
- **Multi-Function Pins defined by PINSEL0 and PINSEL2 registers**
- **Four registers**
 - **IOPIN**
 - **IODIR**
 - **IOSET**
 - **IOCLR**
- **5 Volt tolerant IO levels**

Reset Configurations

- **Bootloader Mode**
If one of pins 16, 17 or 21 is grounded
- **Application Mode**
If all three pins 16, 17 and 21 are pulled high

eForth System

- **32 Bit ARM7 FORTH system**
- **Direct Threaded Code**
- **239 FORTH Words**
- **With utility words:**
 - **DUMP**
 - **WORDS**
 - **SEE**
 - **.S**

Metacompiler

- **LPCEFG.EXE compiles eForth system with FORTH application words in ARM7EXT.F**
- **BIN2HEX.EXE converts LPCEF.BIN to LPCEF.HEX file**
- **LPC210X_ISP.EXE downloads LPCEF.HEX to flash memory in LPC2104**
- **eForth system boots up on power-up and reset if pins 16, 17 and 21 are pulled high**

eForth Demo

- **Boot up**
- **Testing FORTH words**
- **Configure GPIO pins**
- **Read GPIO inputs**
- **Write GPIO outputs**

Metacompiler Demo

- **Application development**
- **Metacompile application**
- **Download application to flash memory in LPC2104**
- **Boot up application**
- **Test application**

Thank you very much!

